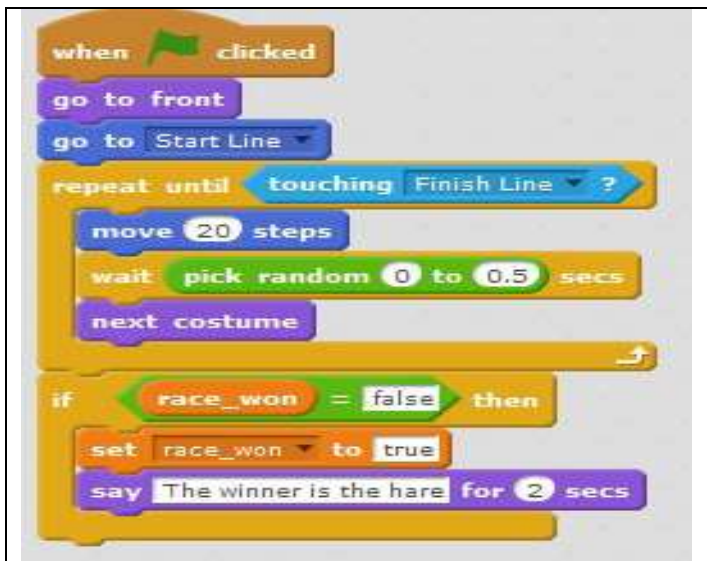


## PART 1: Problem Solving [52 Marks]

### Question 1: (15 marks)

1. Convert the following decimal numbers (100) to their binary equivalents (3marks).
2. Show that the binary number 11001.01 what is represents in denary number (3marks).
3. A mobile phone has a screen resolution of  $320 \times 640$  pixels. How much data (in bits, bytes and KB) is required to display an image, if it use 8 bits for each pixel. (5 marks)
4. Draw the flowchart for the below OUBUILD Script: (4 marks).



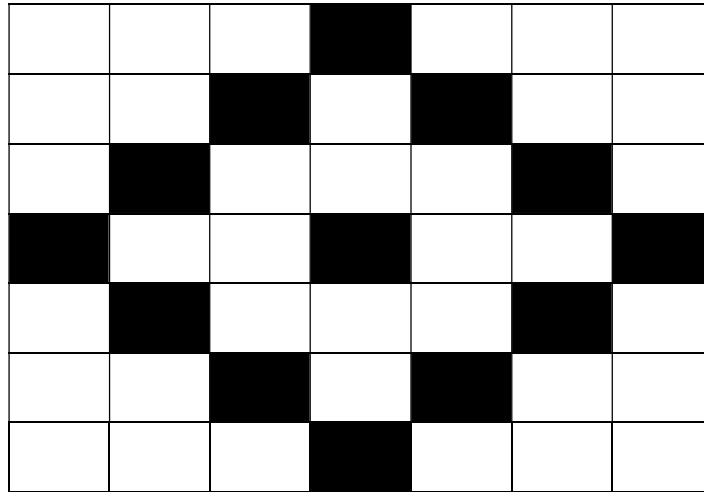
### Question 2: (9 marks)

A company decided to offer discount in the current season, the administration of the company asked you to write an algorithm to help them to manage this process based on the following specifications:

- 1) The algorithm will check if the customer is partner or not.
- 2) If the customer is a partner then the customer will be given a discount based on the following categories:  
If sales is  $\geq 10000$  then the discount is 50%  
if sales is  $\geq 5000$  the discount is 25%  
if sales is  $\geq 1000$  the discount is 10%  
if sales is  $< 1000$  the discount is 5%
- 3) If the customer is not a partner then the customer will pay the full payment without any discount.
- 4) The algorithm should print the total sales, total discount, total sales after discount.



B. The following image is of size 7 x 7 pixels. 5 marks



Represent the image digitally so it can be stored and manipulated by computer.

**Question 3: (31 marks)**

There are some people standing in a circle. You are given their heights in an a list of A[].It is required for each one to print the index of the first person taller than him on his right (print -1 if no one is taller than him).

Example 1 :  
List =[175,166,184,170,187,167]  
Output :  
2 2 4 4 -1 0

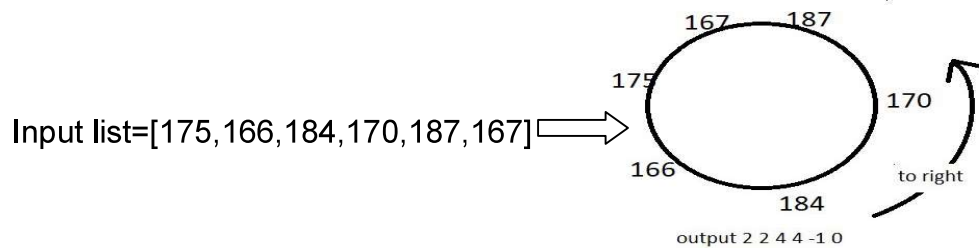
Example 2:  
List =[174,180,184,160,177]  
Output :  
1 2 -1 4 1

**Explanation of example 1:**

The given list A[] of heights is as follows:

A[index]	A[0]	A[1]	A[2]	A[3]	A[4]	A[5]
Content	175	166	184	170	187	167

The person at the starting point of the circle has a height 175. The first person taller than her on her right is 184 (i.e., A[2]). As It is required for each one to print the index of the first person taller than him on his right, 2 is printed. The second one with height 166 has also the same person on her right. Therefore 2 is printed again ... and so on



- 1- Design an algorithm to solve this problem by using loop and if statement with providing full comments on the code. According to the complexity which is covered in the TM111 chapter 6 you should make your algorithm efficient.
- 2- Explain the mechanism of your algorithm by your own words
- 3- Does your algorithm efficient or not (explain based on your answer) explain?

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**End of Assessment**

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*End of Assessment*